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THE SCIENTIFIC WORK OF THE IMPERIAL INSTITUTE.

Imperial Institute: Technical Reports and Scientific Papers. Edited by Wyndham R. Dunstan, M.A., F.R.S., with a preface by the late Sir Frederick Abel, Bart., G.C.V.O., K.C.B., F.R.S. Pp. xlvii + 613. (London: Imperial Institute, 1903.)

OF the several purposes which the Imperial Institute was designed to serve, there is probably none which has been less regarded by the general public than that of scientific and technical research. Such work, however, was definitely one of the objects the advisory committee had in view when considering the proposed building some seventeen years ago; for, as the late Sir Frederick Abel has recorded, this committee was of opinion that the Institute would "afford accommodation for comparing and examining samples by the resources of modern science." In the furtherance of this design there has been gradually evolved an experimental branch, which eventually became known as the "Scientific and Technical Department" of the Institute. At the present time the staff includes ten assistants under the direction of Prof. Dunstan, and the chemical laboratories entirely occupy the upper floor of one wing of the Institute buildings, whilst the help of outside specialists, manufacturers, and commercial experts is invoked as occasion requires.

How this department struggled into existence is described by Sir Frederick in the preface to the volume under notice. It is rather pathetic reading sometimes. There was a difficulty in making any start at all, and to satisfy the "eternal want of pence" afterwards was a harder task still. Hat in hand the committee had to go, begging for money here and for professional help there, first getting, for example, "rupees to the value of 64*l.* 8*s.* 2*d.*" from the Indian Government; then a grant of 300*l.* from the Commissioners of the 1851 Exhibition; next, "small gifts of money, and of some indispensable instruments" from such well-wishers as Sir Lowthian Bell and Dr. Mond; then a donation of 1000*l.* from the Goldsmiths' Company; and so on. How often, in those days, must the organisers have sighed for a sympathetic millionaire! Still—*solvitur laborando*—the thing was eventually done, and in 1896 the department, now on something like a stable footing, was taken in charge by Prof. Dunstan as director.

For the subsequent maintenance of the laboratories thanks are largely due to the Commissioners of the Exhibition of 1851. Acting with a wise liberality, the Commissioners in 1896 made the department a grant of 1000*l.* *per annum* for a term of years, and to this was added a second grant of a like amount two years later. In view of the work accomplished, this contribution of 2000*l.* *per annum* has been continued, and is still enjoyed by the department.

One question, however, may naturally be asked in connection with this matter. Should not the Government, now that it has taken the Institute under its wing, be induced to place the scientific department on

a permanent footing—or at least to become wholly responsible for its support? There appears to be no reason why the Commissioners of the 1851 Exhibition should still assist in carrying on the work.

What has been accomplished by the scientific staff since 1896 is mainly set forth in the present volume. Part i. comprises a large number of technical reports upon various industrial products sent from India and the Colonies, with the view of ascertaining their commercial value and whether there was likely to be any market for them in this country or elsewhere. Minerals of several kinds (including coal, clay, iron-ores, and mica), fibres, oils, rubber, gums and resins, tanning materials, medicinal and food plants, timbers, and miscellaneous articles such as wines, aloes, and capsicums, have been examined and reported upon more or less exhaustively, with the practical result that in some cases a commercial demand has arisen for the article in question, and in others arrangements have been made for a regular supply of the substance, or, it may be, for its improved production and utilisation. Especially noteworthy would seem to be the recognition of *Caesalpinia digyna* as a tanning agent, and of *Podophyllum emodi* and *Hyoscyamus muticus* as sources of the drugs podophyllin and hyoscyamine respectively.

An interesting paper on the coal resources of India is included as an appendix to Part i. To those of us "who only England know," it may come as a surprise to learn that the coal output of the Indian collieries in 1900 exceeded 6,000,000 tons, or about 1/35th of that of the United Kingdom. In quality the coal is generally inferior by about 20 per cent. to that of this country, but on account of its cheapness it is largely used by steamships plying in Indian waters, and the output has increased six-fold since 1880. The supply is considered to be practically inexhaustible. Those amongst us whose geology is local rather than cosmopolitan will learn with interest that these immense Indian deposits are all of much later date than our own Coal-measures, for they occur in the Permian, Triassic, Jurassic, and even Cretaceous and Tertiary formations.

In Part ii. are collected some thirty-five papers of a more purely scientific character. These embody the results of special chemical researches upon various plant-constituents by Prof. Dunstan and his coadjutors, and of investigations into a number of colouring-matters, chiefly by Profs. Hummel and Perkin. Readers of the Chemical Society's publications will be familiar with most of these researches, all of which are interesting, whilst some are of particular importance. The investigations upon the constituents of Indian and American podophyllum, on the aconite alkaloids, and on cyanogenesis in plants may be specially indicated as good examples of the work which has been carried out. In some cases—as, for instance, in the paper on the action of alkyl haloids on aldoximes and ketoximes—it is not quite clear how the chemical question involved was connected with the special work of the Institute, but no doubt such general points would often arise during the progress of researches upon specimens forwarded for examination. On the whole, these "scientific papers" strike

one as being admirable descriptions of useful work, well conceived and ably executed.

As a separate establishment the Imperial Institute has ceased to exist, and is now a department of the Board of Trade. In its time it has played many parts. It has exhibited nuggets to us, sold us cakes and ale, discoursed sweet music to our ears, and charmed our eyes with its fairy-lamps and coloured fires. These things have vanished, as have also many of the splendid, but rather nebulous, generalities which we used to hear concerning the Institute's prospects and probable influence as a factor in Imperial affairs. But at least the definite work of the scientific staff remains, and, presumably, such services as those now rendered will be more and more brought into requisition as time goes on. It may well happen that Prof. Dunstan's laboratory will—to paraphrase a remark of Huxley's—become the forecourt of the temple of success for some at least of the original aims of the Institute, whatever may be the fate of the remainder.

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BABYLONIAN DEMONOLOGY.

The Devils and Evil Spirits of Babylonia. Vol. i. By R. C. Thompson, M.A. Pp. lxxv + 212; with 2 plates. (London: Luzac and Co.)

THE present volume is the first of two which Mr. Thompson intends to devote to a study of the evil spirits and devils of Babylonia, and it will, we believe, be welcomed by readers of many classes. We have been long familiar with the generalisations which writers are fond of making upon this fascinating subject, but so far as we know, no one has before attempted to give a systematic account of Chaldean demonology, and to add at the same time the reasons for the faith which is in him. Those who are interested in cuneiform decipherment will remember that some few years ago the Trustees of the British Museum began to publish a series of classified Assyrian and Babylonian texts, which they issued in parts, each containing 50 plates of text. The earliest parts contained all the material for the syllabary and grammar, then followed lists of words, and afterwards Mr. L. W. King's edition of the Creation tablets. In the present year were published the sixteenth and seventeenth parts of the series, which supplied copies of all the tablets relating to "evil spirits," "fever-sickness," and "headache," carefully made by Mr. R. C. Thompson, and these are the sources of the materials which have been translated in the present volume.

Mr. Thompson gives transliterations of his cuneiform texts on the left hand pages, and English translations on the right; this is an open and honest way of working, and we hope that English Assyriologists in general will follow his example. Nowadays the student demands facts, and the text is the greatest fact of all; no linguistic study can flourish upon bad foundations, and in our opinion the work of the man who hides his texts, or only makes them partially available for students, should be viewed with suspicion. Even a bad text is better than none, for at least workers in England, France, and Germany can

correct it sooner or later. In the present case the British Museum publishes the texts, and Messrs. Luzac the translations, and as each portion of the work is done by the same man we are able to ascertain our position from a scholarly point of view to a nicety.

The publication of evil spirit texts, like so much else, was begun by the late Sir H. Rawlinson, K.C.B., and attempts were made to translate his copies first by Lenormant and secondly by Prof. Sayce. Sir H. Rawlinson, however, only published selections from the great mass of cuneiform literature in the British Museum, and it follows, as a matter of course, that even where they could translate the texts, the conclusions of Lenormant and Prof. Sayce were based on incomplete and insufficient evidence. The subject of Chaldean demonology is at the best a difficult one, and we have no hesitation in saying that the earlier works on it rather hindered than helped the understanding of the matter. Now that the tablets are joined up, and their right sequence found, it becomes clear that the Assyrian scribes were not so stupid as some have thought, and that there really was method in their madness.

It is to Mr. Thompson's credit that he has found out what the Assyrian method was in respect of the evil spirit tablets, and having found this his translations possess unusual value. He will hardly, we think, claim to have settled all the difficulties which he has encountered, but there is little doubt that his present work will form the standard one on the subject for many years to come. In the course of his study we find that he had destroyed a few ideals, and more than one favourite and popular theory. It was fashionable to assert a few years ago that the British Museum contained a tablet which bore on it an allusion to the Garden of Eden, but now that the fragment referred to has been put in its right order, we see that the text on it has nothing whatever to do with the Garden of Eden, and that the tree which was supposed to be nothing more or less than the Tree of Life is the *kishkanu* plant, which grew in Eridu, and was believed merely to possess magical properties. Mr. Thompson has taken great pains to thresh this matter out, and we think that he has proved his points very thoroughly. We can only hope that this exposure will deter that class of Assyriologist which seeks for reputation and popularity by the "finding" of "Biblical parallels" from continuing its charlatanic practices. More harm has been done to Assyriology by such things than by all the mistakes which its followers, from Rawlinson down to Thompson, have made; for even the results which are certain have been discredited by many first-rate Semitic scholars who were unable to read cuneiform.

Another important result of Mr. Thompson's work is the proof that, *au fond*, the demonology of the Semitic peoples of Mesopotamia who used the cuneiform system of writing is of Sumerian origin, and there is good reason to suspect that the greater part of Babylonian psychology and eschatology were borrowed directly from their non-Semitic predecessors in the country. This remark applies also to many of the beliefs which the Hebrews took over from the Babylonians their kinsmen. Want of space will not permit the mention